



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|------------------------|------------------|
| 10/644,145 | 08/20/2003 | Tae-Gyoung Kang | 8729-222 (SS-18970-US) | 5316 |
| 22150 | 7590 | 05/02/2005 | EXAMINER | |
| F. CHAU & ASSOCIATES, LLC 130 WOODBURY ROAD WOODBURY, NY 11797 | | | NGUYEN, DANG T | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2824 | |

DATE MAILED: 05/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/644,145 | Applicant(s) KANG ET AL. | |
| | Examiner Dang T. Nguyen | Art Unit 2824 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 20-33 is/are pending in the application.
- 4a) Of the above claim(s) 12-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 10, 11, 20, 21, 23, 26-30 and 33 is/are rejected.
- 7) ☒ Claim(s) 4-5, 7- 9, 22, 24-25, and 31-32 is/are objected to.
- 8) ☒ Claim(s) 1-33 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>8/20/03, 9/27/04</u> . | 6) <input checked="" type="checkbox"/> Other: <u>Search history</u> . |

DETAILED ACTION

1. This action is responsive to communications: Application and the Information Disclosure Statement filed on 8/20/2003, and IDS filed on 9/27/2004 and 3/14/2005.

2. In response to Examiner's Requirement of Election /Restriction dated 03/17/2005, Applicant elected Group I (claims 1-11, 20-29, and 30-33) for continued examination, with traverse. Examiner respectful traverses from the following:

The applicant argument on the Response to Restriction Requirement is not directed to the reasons set forth by the examiner in Restriction Requirement. To be more specific, the applicant does not provide any evident that shows "the search required for each group (Group 1 – 2) would be the same". Therefore, the restriction for examiner purposes as indicated is proper.

3. Claims 1 - 33 are restricted in this application. Claims 1 - 11, 20 - 29, and 30-33 have been elected. Claims 12 - 19 have been non-elected. Claims 1, 20, and 30 are independent claims.

Drawings

4. New drawings were received on January 12, 2004 and have been approved by the Examiner. These drawings are substituted the original set of drawings filed on August 20, 2003.

Information Disclosure Statement

5. The IDS filed on 08/20/03, 09/27/04, and 03/14/2005 have been considered.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 - 3, 10 - 11, 20 – 21, 26 – 30, and 33 are rejected under 35

**U.S.C. 102(e) as being anticipated by Tsuda et al., Pub. No.: US 2003/0081442 A1 –
filed Oct. 25, 2002.**

Regarding independent claim 1, Fig. 4 of Tsuda discloses a ternary content addressable memory (TCAM) device comprising:

A plurality of TCAM cells for storing data (pages 1 and 2, paragraph [0019]), each TCAM cell having two memory cells [46 and 48] and a comparison circuit [50] for comparing data stored in the memory cells with data input on a search line pair connected to the comparison circuit (page 5 paragraph [0086]), wherein the comparison circuit [50] comprises first [52], second [56], third [54], and forth [58] NMOS transistors, the first [52] and second [56] NMOS transistors having their drains connected to a match line [ML], their gates connected to the memory cells [DATA 1 and DATA 2] and their source connected to drains of the third [54] and forth [58] NMOS transistors, and the third and forth NMOS transistors having their gates connected to the search line pair [CMP and CMPN] and their source connected to ground (see fig. 4).

Regarding dependent claim 2, Tsuda discloses wherein the comparison circuit [50] discharges the match line upon a mismatch between data stored in the memory cells and data input on the search line pair connected to the comparison circuit (page 5, paragraph [0088]).

Regarding dependent claim 3, Tsuda discloses further including a precharge circuit connected to the search line pair for discharging each line of the search line pair to ground upon determination that at least one of the memory cells connected thereto are defective (page 5, paragraphs [0087-0088]).

Regarding dependent claim 10, Tsuda discloses wherein the memory cells are SRAM cells (page 3, paragraph [0042]).

Regarding dependent claim 11, Tsuda discloses wherein the memory cells are DRAM cells (page 6, paragraph [0116]).

Regarding independent claim 20, Fig. 4 of Tsuda discloses a ternary content addressable memory (TCAM) device comprising:

A plurality of TCAM cells for storing data (pages 1 and 2, paragraph [0019]), each TCAM cell having two memory cells [46 and 48] and a comparison circuit [50] for comparing between data stored in the memory cells and data input on a search line pair connected to the comparison circuit (page 5 paragraph [0086]), wherein the comparison circuit [50] comprises a first plurality of MOS transistors [52 and 56] connected between a match line [ML] and a second plurality of MOS transistors [54 and 58], the second plurality of MOS transistors being connected to ground (see Fig. 4), wherein the first plurality of MOS transistors [52 and 56] are gated by signals from the memory cells

[DATA 1 and DATA 2] connected thereto and the second plurality of transistors [54 and 58] are gated by signals from a search line pair [CMP and CMPN].

Regarding dependent claim 21, Tsuda discloses wherein the first and second plurality of MOS transistors are N type and are configured to connect the match line to ground upon a mismatch of the data in the corresponding memory cells with the data present at the corresponding search line pair (page 3 paragraphs [0051 and 0054] and page 5, paragraph [0088]).

Regarding dependent claim 26, Tsuda discloses further including a precharge circuit connected to the search line pair for discharging each line of the search line pair to ground upon determination that at least one of the memory cells connected thereto are defective (page 5, paragraphs [0087 and 0088]).

Regarding dependent claim 27, Fig. 8 of Tsuda discloses a memory controller [MASK CIRCUIT] for outputting control signals for controlling operations of the TCAM (page 1, paragraph [0006], lines 6-10).

Regarding dependent claim 28, Tsuda discloses wherein the memory cells are SRAM cells (page 3, paragraph [0042]).

Regarding dependent claim 29, Tsuda discloses wherein the many cells are DRAM cells (page 6, paragraph [0116]).

Regarding independent claim 30, Fig. 4 of Tsuda discloses a method of operating a ternary content addressable memory (TCAM) device comprising: comparing data stored in memory cells (page 5 paragraph [0086]), of the TCAM with data input on a search line pair [CMP and CMPN] connected to a comparison circuit [50], wherein the comparison circuit [50] comprises a first plurality of MOS transistors [52 and 56]

Art Unit: 2824

connected between a match line [ML] and a second plurality of MOS transistors [64 and 58], the second plurality of MOS transistors [54 and 58] being connected to ground (page 5, paragraph [0085]), wherein the first plurality of MOS transistors [52 and 56] are gated by signals from the memory cells [DATA 1 and DATA 2] connected thereto and the second plurality of transistors [54 and 58] are gated by signals from a search line pair [CMP and CMPN].

Regarding dependent claim 33, Tsuda discloses further including discharging to ground each line of the search line pair upon determination that memory cells connected thereto are defective (page 5, paragraph [0087 and 0088]).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuda et al., Pub. No.: US 2003/0081442 A1 - filed (10/25/02) in view of Hatanaka et al., Pub. No.: US 2004/0022098, filed (7/28/03).

Tsuda et al., as applied to claims 3 and 20 above disclosed every aspect of applicant's claimed invention except for a repair signal generator for generating signals indicating which of the memory cells are defective.

Hatanaka discloses a repair signal generator for generating signal that indicates a defective memory cell (page 1, paragraph [0009], lines 5-8).

Tsuda and Hatanaka are common subject matter for memory cells. Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate Hatanaka's signal generator into Tsuda's TCAM device for the purpose of indicating a signal of defective memory cell for repairing a defective memory cell row of the memory cell rows that includes a defective memory cell (paragraph [0030]).

Allowable Subject Matter

8. Claims 4 - 5, 7 - 9, 22, 24 - 25, and 31 - 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

With respect to claim 4, the primary reason for indication of allowable subject matter is that the prior art fails to teach or suggest "two NMOS transistors have its gate connected to a power supply node, its source connected to ground and its drain connected to a corresponding one of the search line pair".

With respect to claims 7, 24, and 31, the primary reason for indication of allowable subject matter is that the prior art fails to teach or suggest "redundant TCAM cells and a switching circuit for switching at least a plurality of connections of TCAM cells determined to be defective to corresponding connections of the redundant TCAM cells".

With respect to claim 22, the primary reason for indication of allowable subject matter is that the prior art fails to teach or suggest "a main search line driver for driving data signals to a plurality of search line pairs and at least one redundant search line driver for replacing the main search line driver upon determination that at least one of the memory cells connected to a corresponding search line pair are defective".

Prior art

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Liu et al. Pub. No.: US 2004/0213027 A1 Pub. Date: Oct. 28, 2004

Aikawa Pub. No.: US 2003/0206466 A1 Pub. Date: Nov. 6, 2003

Nataraj Patent No.: US 6,845,025 B1 Date of Patent: Jan. 18, 2005

Contact Information

10. Any inquiry concerning this communication from the examiner should be directed to Dang Nguyen, who can be reached by telephone at (571) 272-1955. Normal contact times are M-F, 8:00 AM - 4:30 PM.

Upon an unsuccessful attempt to contact the examiner, the examiner's supervisor, Richard Elms, may be reached at (571) 272-1869.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, whose telephone number is (703) 305-3900. The faxed phone number for organization where this application or proceeding is assigned is (703) 872-9306.

Art Unit: 2824

Information regarding the Status of an application may be obtained from the patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or EBC@uspto.gov.

Dang Nguyen 4/28/2005

**ANH PHUNG
PRIMARY EXAMINER**